

1.0 INTRODUCTION

This volume, Volume C, “Basin Prioritization for the Estero Bay Watershed” is presented as one of a series of reports developed for the Estero Bay and Watershed Assessment Plan for the South Florida Water Management District (SFWMD). The reports in this series include:

- ! Volume A. Literature Survey of the Estero Bay Watershed
- ! Volume B. Characterization Report
- ! Volume C. Basin Prioritization Report
- ! Volume D. Management Goals Report
- ! Volume E. Monitoring Report
- ! Volume F. Estero Bay Research Plan

1.1 Study Area

The Estero Bay Watershed includes the area in Lee County south of the Caloosahatchee River, parts of northeastern Collier County, and a small portion of Hendry County (Figure 1-1). Much of the northern part of the watershed includes the City of Ft. Myers. Other population centers include Bonita Springs and the City of Ft. Myers Beach.

The watershed includes all of Estero Bay, most of which lies within the Estero Bay Aquatic Preserve, and the adjacent barrier islands. Hendry Creek, Mullock Creek, the Estero River, areas of Corkscrew Swamp, Spring Creek, and the Imperial River are major surface water features in the basin. These waterways, with the exception of Ten-Mile Canal, are tidally influenced to some degree. The Estero River east of U.S. 41 has slow conveyance and is considered a recharge area along with the Imperial River east of I-75 (JEL, 1998). In some areas, local drainage canals provide limited regional flood protection during wet periods, but also lead to over-drainage during dry periods.

The Estero Bay Watershed is divided into nine secondary basins for the purpose of this report:

- | | | |
|----------------|---------------------------|-------------------|
| ! Estero River | ! Mullock Creek | ! Cow Creek |
| ! Spring Creek | ! Six-Mile Cypress Slough | ! Imperial River |
| ! Hendry Creek | ! Ten-Mile Canal | ! Barrier Islands |

Cow, Hendry, and Mullock creeks are coastal basins that flow into north Estero Bay. Six-Mile Cypress Slough and Ten-Mile Canal do not discharge directly into the bay but are important conveyances into Mullock Creek, which flows directly into the bay. The Estero River and Spring Creek flow into the bay farther south in the central and southern bay. The Barrier Islands Basin lies off the coast, along the length of Estero Bay.

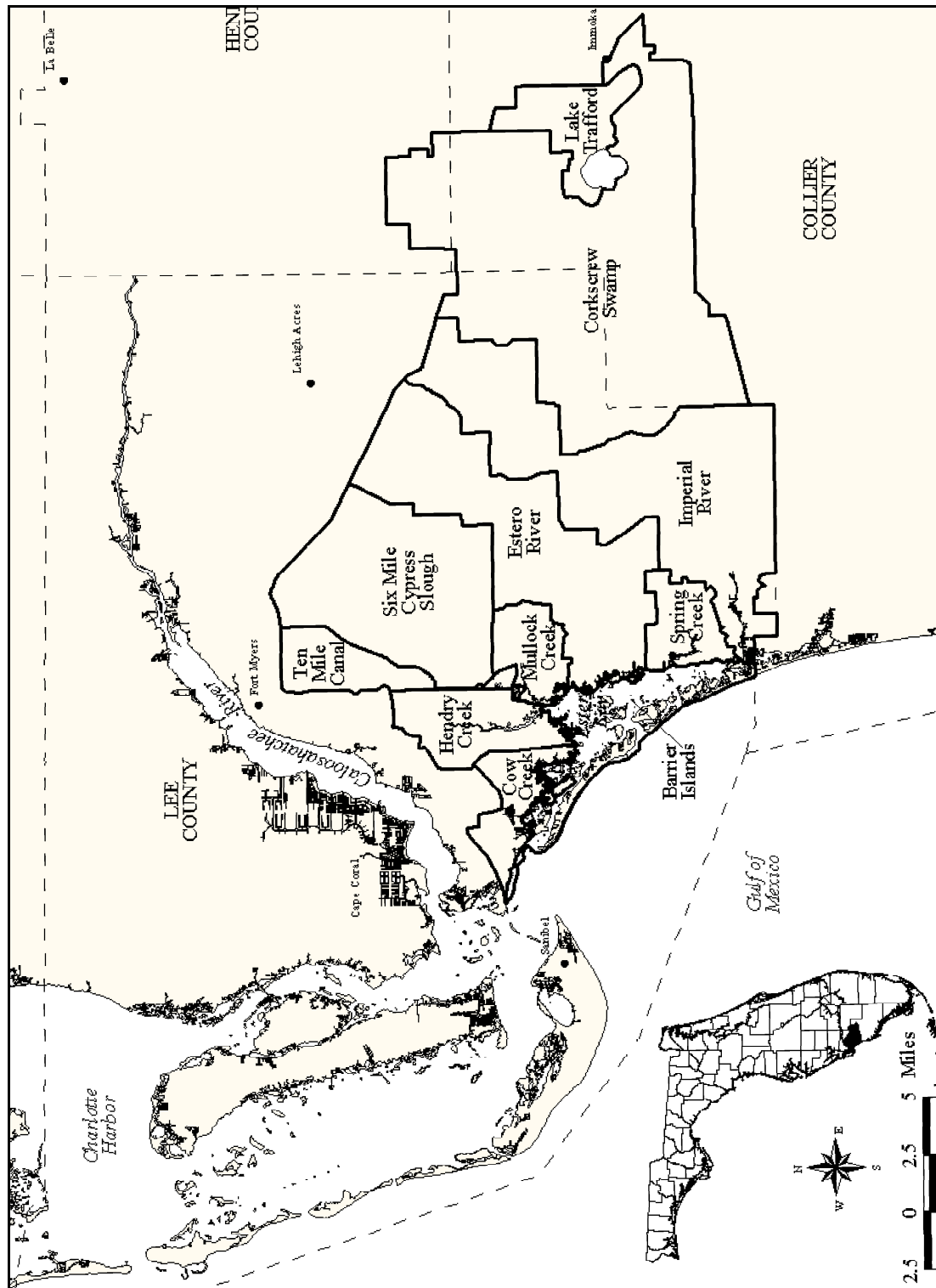


Figure 1-1. The Estero Bay Watershed.

The Estero Bay Watershed contains 192,468 acres. The Imperial River, Estero River, and Six-Mile Cypress Slough basins each make up between 35,000 and 54,000 acres and together make up almost 70% of the watershed. Cow Creek, Ten-Mile Canal, Hendry Creek, Spring Creek, and Barrier Islands basins are much smaller, each making up no more than 8% of the entire watershed.

Table 1-1. Acres and percentage of watershed for the nine secondary basins in the Estero Bay Watershed.		
SECONDARY BASIN	ACRES	PERCENT
Ten-Mile Canal	8,717	5%
Six-Mile Cypress Slough	35,027	18%
Mullock Creek	6,995	4%
Estero River	45,381	24%
Imperial River	53,664	28%
Cow Creek	7,985	4%
Hendry Creek	11,623	6%
Spring Creek	7,350	4%
Barrier Islands	15,726	8%
Total	192,468	100%

1.2 Background

Because of the rapid rate of development and population growth in southwest Florida and the resulting concern over potential environmental impacts, a series of initiatives has been proposed to balance development and environmental interests. These initiatives include the:

- ! Arnold Committee,
- ! Charlotte Harbor National Estuary Program,
- ! Corps of Engineers Environmental Impact Statement, and the
- ! South Lee County Watershed Plan.

The Arnold Committee is a cooperative planning committee composed of representatives from state and federal regulatory agencies, Lee County Government, the Responsible Growth Management coalition, affected property owners, and environmental organizations. The Committee was formed as a non-regulatory advisory body as part of the settlement agreement between Florida Gulf Coast University and the Responsible Growth Management Coalition. The Arnold Committee was convened and designated to provide a framework for the development of needed actions. Both this

Estero Bay Watershed study and the Estero Bay Study are designed to provide the needed background information for the Agency on Bay Management (ABM) and the basis for continuing actions by the South Florida Water Management District. The Estero Bay Watershed Basin Prioritization report is part of the Scientific Assessment portion of the Estero Bay Management and Improvement Plan which is being developed by the SFWMD with the assistance of the Arnold Committee.

Charlotte Harbor has been identified as one of several nationally significant estuaries as part of the National Estuary Program (NEP), a program funded by the U.S. Environmental Protection Agency (EPA). The goals of the NEP are the restoration and protection of nationally significant estuaries through the identification of the estuaries, the establishment and oversight of a process for improving and protecting estuary water quality, and enhancement of the living resources of the estuary (EPA, 1992). Charlotte Harbor, of which Estero Bay makes up the southernmost portion, is one of three regionally important estuarine systems included in the NEP. The Charlotte Harbor NEP will address these problems with the development of a Comprehensive Conservation and Management Plan (CCMP) for managing the estuarine watershed.

The degree of local, state, and federal concern regarding existing and potential impacts to regional estuarine systems resulting from hydrologic alterations and the degradation of water quality is indicated by the fact that this estuary has been designated for special study, protection, and restoration under regional NEPs. In general, the need for restoration activities has been shown to be greatest for the more northern estuarine systems, where the impacts associated with surrounding development have been both more intense and extended back prior to the implementation of many of the current environmental regulations and management practices. Conversely, the NEPs have indicated the potential opportunities for prevention and preservation to be the greatest within the watersheds surrounding the more southern southwest Florida estuaries where historic development has been less intense.

Another initiative to seek an effective balance between natural systems protection and economic stability in the region is the U.S. Army Corps of Engineers (USACE) Environmental Impact Statement (EIS) for an area spanning portions of Lee and Collier counties in southwest Florida, in which the Estero Bay Watershed is located. The EIS was drafted in response to the increasing number, size, and complexity of development permit requests by citizens and business interests of southwest Florida and the difficulty of adequately evaluating the cumulative impacts of development on a permit by permit basis. The EIS was designed to offer regulatory and planning-based remedies to these limitations by examining the “natural and social interactions” in the study area.

The Alternatives Development Group (ADG) was formed to support the USACE in the creation and evaluation of alternatives for the EIS. The specific charge of the ADG was to report on alternatives for improving the regulatory process to:

- ! protect natural environmental values,
- ! provide for sustainable economic growth,
- ! manage appropriate changes in water flows and quality, and
- ! respect public involvement and private rights.

In addition to the above initiatives, the South Florida Water Management District developed the South Lee County Watershed Plan, which also addresses problems associated with development in Lee and Collier counties. As part of the Plan, Johnson Engineering developed a hydrologic-hydraulic model, an ecological assessment, and a problem identification and evaluation of existing hydrologic-hydraulic conditions in the Estero Bay Watershed (JEI, 1998). From this study, it was found that sheet flow has been substantially altered and the cumulative effects of seemingly small hydrologic diversions have changed the direction of flow from basin to basin within the watershed.

1.3 Basin Prioritization Objectives

The objective of this basin prioritization task was to evaluate and provide relative ranks to the tertiary basins within the Estero Bay Watershed as potential sources of:

- ! excess freshwater discharge,
- ! nutrient loading, and
- ! sediment loading.

Tertiary basins were operationally defined as the watersheds of canals and natural channels which are directly tributary to the eleven secondary basins (PBS&J, 1999). Figure 1-2 presents the locations and identifying numbers for all of the secondary basins within the study area. A total of 62 tertiary basins were delineated, ranging in size from 38 to about 41,600 acres.

The District has identified a number of key evaluation criteria for prioritizing potential impacts within the Estero Bay Watershed. These key criteria are:

- ! urban runoff discharge,
- ! agricultural runoff discharge,
- ! TSS loading,
- ! total phosphorus loading,

- ! total nitrogen loading, and
- ! wastewater and industrial discharge.

An additional criterion, wetland area at risk, was also estimated for each of the tertiary basins within the Estero Bay Watershed. Rapid growth and urbanization clearly creates the potential for not only changes in runoff and nutrient and sediment loading, but also for wetland losses.

Generally, the overall approach was to estimate values for each of these criteria for each secondary basin. The emphasis of this task is on screening and thus these estimates must be **unbiased relative values** that support a valid comparison of secondary basins. These relative values for each criterion were not developed to provide absolute estimates of discharge and loadings to the bay, as this task is to be undertaken by the modeling effort to follow the Estero Bay and Watershed Assessment. The relative rankings are to be utilized to determine those tertiary basins which are high priority with respect to each criterion, identifying those tertiary basins for which management options are developed to address the various criteria.

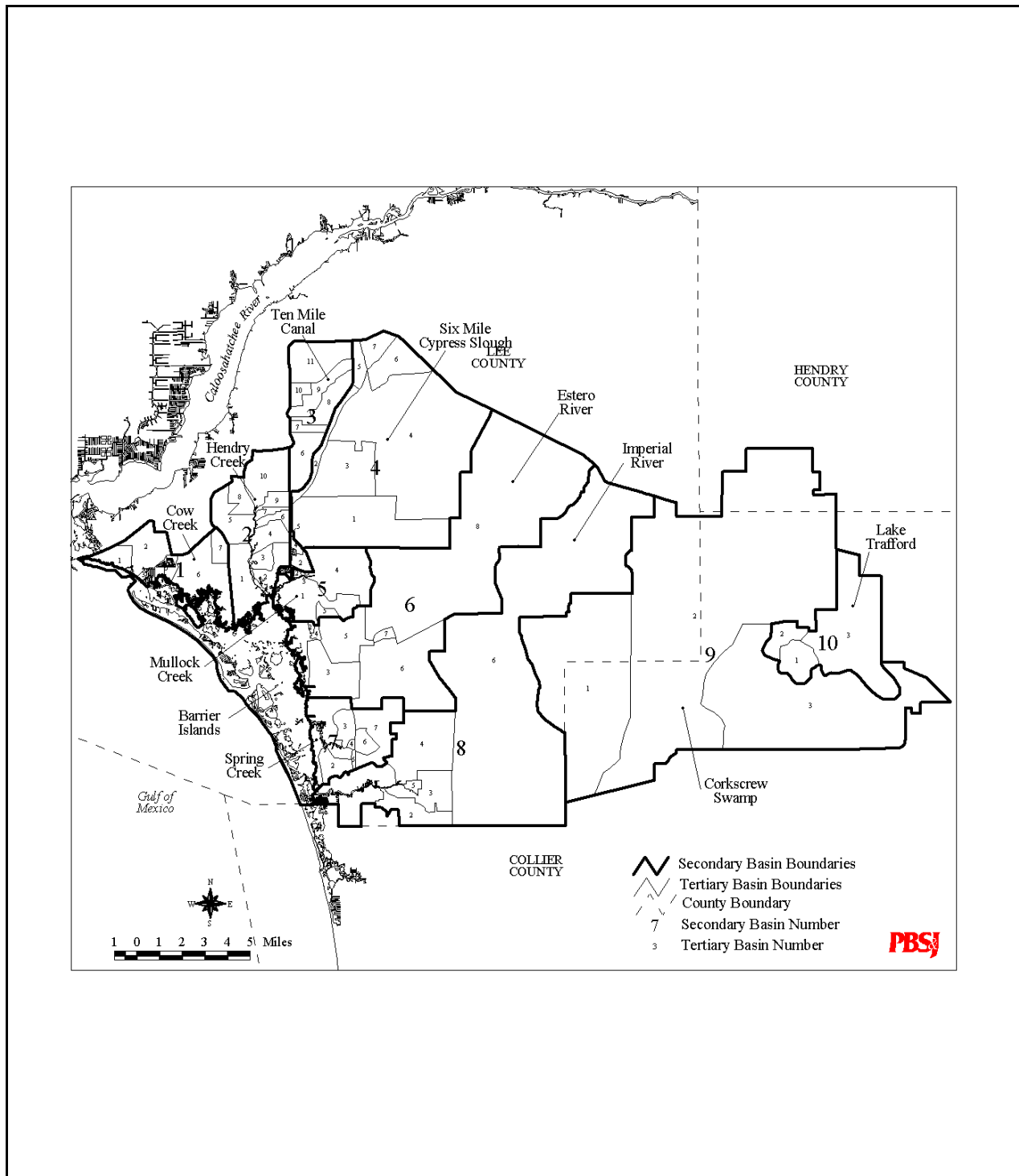


Figure 1-2. Secondary Basins within the Estero Bay Watershed.